52. In the next generation network architecture, as the loop signal exits the NGDLC electronics in electrical form, it travels over a copper cross-connect to the copper distribution cable. In the case of lines carrying both data and voice signals, technical requirements dictate that these signals be separated at the end of the copper loop to permit the voice service to be channeled to the digital loop carrier ("DLC") system and the high frequency signal be multiplexed and transported back to the central office. This function is accomplished with a splitter, a relatively small, combined DSLAM/splitter mounted in the CEV on a wall or in a spare or partially used relay rack.

COLLOCATION AT THE REMOTE TERMINAL

A. TYPES OF REMOTE TERMINALS ENCLOSURES

53. There are a number of enclosures that may be encountered where fiber feeder meets the copper facilities. Typically these enclosures, generally referred to as the remote terminals, have drop wires extending to the customer's premise. The cable pairs connecting these terminals to end users are planned in an orderly fashion to allow the design engineer to plan and size the distribution cable properly. This accumulating process eventually dictates the number of terminations required for sizing the Feeder Distribution Interface ("FDI"). Based on this analysis, the engineer will determine which type of remote terminal should be deployed in each particular location. In order to understand the potential ramifications of collocating CLEC equipment in these various enclosures, some common understanding of them is required.

54. A CEV is a structure that is below ground, similar to a manhole, *i.e.*, a pre-cast rectangular concrete box (Maximum = 10'W x 24'D x 8'H, Minimum = 8'W x 16'L x 8'H) that is assembled from two parts (a top and a bottom) which allows the placement of an equipment pallet into the bottom portion prior to final assembly. Generally a hatch type assembly at one end on top permits entry, while conduits enter the structure at the ceiling level on the short wall

opposite the entry space. The "short" walls (which are the width of the rectangle) usually contain various mountings such as a breaker panel and environmental detectors (such as a smoke alarm, temperature alarm, etc.) at the entry end and only conduits on the opposite end. The "long" walls on the other hand are typically occupied with relay racks for electronics; opposite the electronics are protector terminations for the copper cable pairs arriving from the FDI—the interface between feeder and distribution cables—which in turn are hardwired overhead to the electronics. Fiber feeder cables transporting the signals back to the central office enter the CEV via the same conduit window and are terminated in close proximity to the multiplexer/common control assembly of the electronics.

55. A hut is a prefabricated concrete structure with dimensions of approximately 10'W x 24'L x 8'H (Maximum) or 8'W x 16'L x 8'H (Minimum). The structure can have various facades (e.g. rough pebble, brick or wood) as surrounding architecture dictates. These structures usually contain sufficient relay racks to accommodate designed DLC requirements and ancillary hardware (e.g. Bulk Power, Protector Distribution Frame, Repeater Shelves, etc.) Huts are generally not located in buildings but rather are located in the field. It is also possible for manufacturers to produce huts capable of expansion.

56. A cabinet is a weatherproof metal enclosure used to house DLC equipment. Cabinets contain heat exchangers to help dissipate heat from the structure without introducing outside air to the equipment chambers. While there are a number of different manufacturers, the cabinets are normally sized to contain sufficient DLC systems and ancillary hardware to support the engineering design. Typically, the dimensions are 112"W x 46"L x 72"H, 93"W x 46"L x 72"H, or 44"W 42"L x 72"H. Cabinets are accessible from the front and rear for shelf assemblies, and

at the end(s) for splice/power chamber and terminations. Cabinets are generally not located in buildings but rather are located in the field.

57. Generally remote terminals are constructed with sufficient spare conduit, power and HVAC to supply a completely full remote terminal, because they are packaged and delivered already assembled with equipment racks. Therefore, additional conditioning would rarely be needed to accommodate collocated equipment in the remote terminal. If spare conduit capacity exists, CLECs should be able to utilize this conduit for its collocation at the remote terminals, as opposed to the CLEC having to build new capacity even if spare is available. Additionally, the deployment of DLC line cards for xDSL technologies other than ADSL would not normally require any additional power, HVAC or fans. Different xDSL technologies have different transmission power characteristics, and therefore require different levels of power. Typically, the higher the density of the card, the more power the card would need. As the remote terminals ("RTs") were planned for ADSL and ADSL is one of the cards with the greatest density, very rarely would interconnection by a competitor require additional power. As the heat produced by equipment is a function of density and speed of the transmission, ADSL—the fastest and most dense DSL technology—produces more heat than any other DSL technology. Because all of the ILECs planned the HVAC for their remote terminals based on a terminal filled with ADSL DLC line cards, the placement of other DSL line cards would logically produce less heat, thus *not* require more air conditioning. If in fact an exceptional circumstance exists that requires conditioning, CLECs should only have to pay for the conditioning expenses associated with the amount of space the competitor purchases for interconnection.

B. ACCESS TO NETWORK CONFIGURATION AND PLANNING INFORMATION

58. When choosing and deploying the different types of remote terminals to be placed in the plant, the ILECs not only design the remote terminals with certain capacities for cabling, power, and heat, they record specific information about the remote terminals to be used for offering services over the DLC architecture. It is, however, unclear exactly what specific additional records ILECs maintain regarding their remote terminals. ILECs refuse to provide CLECs with direct access to these records. Much like the ILECs, competitive carriers must reach their own conclusions about the services to be deployed in designing its own network over the ILECs' existing facilities, such as remote terminals. The minimum set of information required by CLECs to make informed decisiones about the placement in remote terminals is:

(1) number and types of DLCs deployed not just specific RT location specified by the CLEC;
(2) names and CLLI of all DLCs associated with each CO;
(3) number of DLC equipped lines per CO;
(4) % of total lines served by DLCs within each wire center;
(5) identify the number of copper fed vs. fiber fed DLCs;
(6) identify the number of lines served in each category (i.e. copper fed, fiber fed);
(7) DLC capacity (number of lines capable and number of lines equipped) for each DLC served from the COs;
(8) DLC manufacturer, model number for each DLC served from the COs;
(9) DLC configuration/type (i.e. DLC, NGDLC, fiber fed or copper fed) for each DLC served from the COs;
(10) capacity of distribution facilities (e.g. wire gauge, connector blocks, protection devices, cabinet access and egress, etc.) between the DLC and customer premise for each DLC served from the COs;
(11) availability and type of transport facilities (e.g. fiber, copper, DSx, OCx) available between the DLC and CO
(12) type and size of structure housing the DLC (e.g. cabinet, hut, CEV, building);
(13) any construction restraints regarding placement of power (depth of placement, conduit vs. no conduit, wire gauging requirements, service amperage requirements, etc.);
(14) latitude/longitude and address or other geographic location information for DLCs;
(15) distance from the CO to the DLC;
(16) distance from the DLC to Feeder Distribution Interface (FDI);

(17) longest loop distance served by the DLC (loop length between the DLC site and the customer premise);
(18) availability of space inside the DLC cabinet/structure;
(19) availability of existing right-of-way adjacent to DLC cabinet/structure or FDI;
(20) any dimensions of the right-of-way/easement;
(21) any zoning requirements (i.e. buffer zone);
(22) any restrictive covenants if the DLC is located in or near a sub-division;
(23) whether CLEC can gain access to that particular right-of-way or easement without obtaining franchise rights;
(24) whether the DLC is located in a flood plain or are there other environmental circumstances that should be given consideration? If so, how is ILEC addressing those environmental concerns;
(25) whether vehicular access is available to the DLC;
(26) the address and phone numbers of the end users served by the FDIs served through the RT; and
(27) availability of adjacent alternatives and minimum space requirements, if any.

59. In addition for fiber-fed loops, CLECs continue to need basic loop information, such as (1) actual loop length; (2) gauge of the loop at each length; (3) presence of repeaters, load coils, or bridged taps; (4) approximate location of each of these devices; (5) presence, location, type and number of pair gain devices, such as DLC and DAMLs; and (6) the presence of disturbing technologies near the loop.

60. At this time, the ILECs have not agreed on their own to provide Rhythms with the information on the remote terminals that Rhythms needs to configure its network to provide the service it intends to offer. For instance, Verizon has only offered to provide the following information to CLECs: the type of enclosure, whether the site is on private or public property, and if the site is on private property whether Verizon's easements can be assigned to the CLEC.[8] Likewise, SBC intends to provide CLECs with the RT Common Language Location Identification ("CLLI") code, the CLLI code of the wire center served by the RT, the location and type of RT and the postal address range, however SBC refuses to provide lists of actual end

[8] Verizon Proposed NY P.S.C. Tariff 916, Section 5.10.3.B.

users address and telephone numbers served.[9] SBC specifically refuses to provide lists of actual end user addresses served by the NGDLC architecture.[10] In its draft interconnection agreement amendment, BellSouth proposes to merely specify the amount of available space in the RT, the number of CLECs present at the RT, any changes in use of RT space, and any plans to make additional space available in the RT at a cost of $550 per RT, while requiring Rhythms to separately obtain the CLLI code from NECA's FCC Tariff No. 4 and the RT location from Telecordia.[11]

61. The information that the ILECs are currently willing to provide is insufficient. With the vast number of planned RTs to be deployed, unaffiliated CLECs cannot afford to decide which remote terminals to collocate equipment in based solely on a guesstimate of how many end users could potentially be served by an ILEC's DLC. All CLECs, including Rhythms, need access to the exact information that the ILECs have access to, in order to make informed decisions regarding their own deployment. In addition, it is also unclear why more information cannot be obtained from an engineering records review. In order to avoid delay and unnecessary expense, the engineering records review process should be combined with the site survey for a space availability inquiry.

62. Because competitors, such as Rhythms, depend directly on the public switched network, they should be included in the development and design of that network, especially any changes that directly effect their ability to provide service of such network. The ILECs would likely contend that under the basic principles of the American economic system, competitors

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[9] *SBC Pronto/CLEC Collaborative Issues Log*; <http://www.sbc.com/PublicAffairs/PublicPolicy/Wire_Centers/docs/Pronto-AIT.xls>.

[10] *SBC Pronto/CLEC Collaborative Issues Log*, Item 8.5.

[11] BellSouth Proposed Remote Terminal Collocation Interconnection Agreement Amendment, § 2.2. ("BellSouth RT Collocation Amendment")(see Attachment A).

have no say in deciding the evolution of the network because it is not "theirs". But in fact, such a network was built under the guise of a long-standing monopoly belongs just as much to competitors, as it does to the incumbents. To ensure all carriers, incumbents and competitors, using the public switched network have input into development in network, those carriers must coordinate, cooperate and plan the network buildouts and upgrades with consideration and accommodation of the needs of all carriers using the public network.

63. There has been no real coordination or accommodation to date. Without any coordination or accommodation, the CLECs will be at a significant competitive disadvantage, because they are powerless to plan effective deployment for their own networks. For example, SBC acknowledged that it was unnecessary to take the needs of competitors into account in its planned modifications to the network for its Project Pronto NGDLC network.[12] Additionally, after repeated requests Verizon has constantly refused to even tell where in the network the NGDLC technology is going to be deployed so competitors can make their own plans for deployment to date. CLECs, such as Rhythms, need to be involved in the development of network architecture, not as a competitor of the incumbent but as a carrier on the public network.

C. REMOTE TERMINAL COLLOCATION

64. Some ILECs propose limited collocation options in the different types of remote terminals that would provide CLECs with neither practical nor economic access to the fiber-fed loop. Several ILECs have proposed that carriers collocate a traditional DSLAM in the remote terminal or at the FDI and then either build their own feeder or purchase the ILECs feeder (at

[12] SBC Project Pronto Product Overview, Transcript at 91 (Mar. 1, 2000).

non-UNE rates) to connect to their collocation equipment at the central office.[13] While Rhythms wants the option to collocate a traditional DSLAM at a remote terminal, this option may not be the most efficient and effective way to provision DSL over fiber-fed loops, and indeed this option routinely may not be available. In many, if not most, cases there is not enough space in the RT for requesting carriers to collocate an entire shelf of equipment.[14] Even where there is space, it will be a rare instance where a CLEC can be assured to do enough business out of any single RT to justify the expense of a full rack of equipment that normally serve several hundred end users, or even a "pizza box" DSLAM.

65. Another option for collocating inside the remote terminals is through the collocation of a next generation "pizza-box" DSLAM. To allow CLECs to use scarce space more efficiently, equipment manufacturers have recently begun to sell DSLAMS that are more compact than a traditional DSLAM and cost less. Because of their size and shape, they have be dubbed by the industry as the "pizza-box" DSLAM. These smaller DSLAMs have the same functionality as a traditional DSLAM, but is about half the size and capacity. For instance, Paradyne and Copper Mountain produce the "pizza-box" style DSLAM, which serves between 48 and 96 lines. CLECs, however, would have similar problems with collocation of these "pizza-box" DSLAMs in the remote terminals as they would with traditional DSLAMs, in the way of not being able to serve enough customers out of a particular RT location to make collocating even a "pizza-box" DSLAM cost-efficient.

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[13] BellSouth RT Collocation Amendment, § 3.2; SBC Draft Overview of Remote Terminal Collocation (Aug. 24, 2000) at 2 (see Attachment B); VZ-MA DTE Ma. Tariff No. 17, Part B. Section 18.1.1.A, Unbundled Sub-Loop Arrangement.

[14] Letter from Paul K. Mancini, Vice President & Assistant General Counsel, SBC Communications, Inc., to Lawrence E. Strickling, Chief, Common Carrier Bureau, FCC at 2 (Feb. 15, 2000)("*SBC Project Pronto Letter*").

66. The ILEC response is to require CLECs to procure adjacent remote terminals, that they must build and pay for. The economic justification for this proposal is even worse. Under this configuration the means to connect the DSLAM to the unbundled fiber feeder network element may not be technically feasible, let alone commercially viable. Moreover, as SBC notes, placing entire DSLAMs at an RT may require "a so-called 'village of RTs', which neighborhoods and governmental entities would not find acceptable" or the need to "create RTs the size of a central office."[15] In addition to the hard to recover costs of placing a DSLAM at the remote terminal, the cost of running a cross-connection to the fiber feeder network element each and every time a new DSL customer is brought up would likely be prohibitive. While the costs of interconnecting a traditional DSLAM alone make this arrangement generally impractical, the additional costs of dispatching technicians to run cross connections at the remote terminal compound this effect. Thus, this option provides some flexibility, but is generally unacceptable for carriers attempting to compete in the market.

67. In addition, it is unreasonable to believe that there will be enough conduit space at any RT location for all competitive carriers to place adjacent interconnection arrangements, for instance those areas served by five or six competitive DSL carriers. Actually, numerous separate adjacent arrangements may not only exhaust the conduit space more quickly, it will also unnecessarily waste the DS3 facilities serving to cross connect the adjacent arrangements to the remote terminal. If the CLECs choose to purchase the entire local loop or the ILEC fiber feeder subloop to carry the signal back between the RT location and the CO, the adjacent arrangements will increase the chances of exhausting the capacity of the feeder that the ILECs complain about in 97.

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[15] *SBC Project Pronto Letter* at 2.

68. It is often advantageous for ILECs to install remote terminal equipment on privately owned premises where land-use restrictions arise from rights-of-way, easement and zoning requirements. The ILECs have negotiated agreements with municipality, county, state, company, developer, owner's association or individual that owns the land. Thus, for CLECs to place any equipment in adjacent interconnection arrangements at the ILECs' remote terminal locations, CLECs must obtain an agreement with the land owner, however the land owner has not obligation whatsoever to provide such agreement.

69. Unlike the ILECs, which have a historical access based on their monopoly position in the market, CLECs may not be able to gain authorization and permits from local municipalities and private landowners to build adjacent RTs. Moreover, imposing these costs and burdens on the CLECs are unreasonable and inhibit the competitors' access to their network. For example, when attempting to build conduit in the street, Rhythms has had to pursue a licensing agreement with the city to act as a telecommunications provider within the city limits. Though the licensing process usually takes about 30 to 45 days, in some cases has taken as long as 90 days, which is three additional months that Rhythms had to wait before its collocation could become operational. Similarly, when placing conduit or cable along a state highway, CLECs would also have to meet the permit requirements of the state agency governing highways.

70. Based on their own internal, operational policies, the ILECs have unilaterally decided to leave CLECs, such as Rhythms, stranded at the remote terminal locations, or even further out in the plant as is the case with SBC's Apollo Project, as explained further in ¶ 96. SBC, Verizon and BellSouth refuse to provide the portion of the local loop that connects the remote terminals back to the central office, and in some instances even from as far out as the serving area

interface.[16] In other words, the ILECs will only provide the portion of the local loop that extends from the end user to wherever the copper ends, claiming that fiber feeder is no longer part of the local loop. In addition, BellSouth has instituted an additional limitation that CLECs can only establish adjacent interconnection arrangements "where the Remote Site Arrangement does not interfere with access to existing or planned structures or facilities on the Remote Site Location property."[17] Thus, SBC reserves the option to own the structure, which it builds if more than one CLEC is requesting space. In doing so, SBC places additional operational expenses on the use of adjacent interconnection and further ensures that it can retain control of right-of-way or easement without over-committing itself.[18]

71. The cost of deploying adjacent interconnection arrangements at the RT an unrealistic option for competitors, especially in light of the fact that space exhaustion will occur in most "shrink-wrapped" remote terminals. The ILECs consistently require that CLECs purchase adjacent arrangements on individual case basis ("ICB") or under special construction arrangements, either way the ILECs prefer this method over set costs and provisioning intervals, because they choose the interval and price under which the arrangement will be sold.[19] The calculus become more daunting the further out in the network RTs are deployed since each structured serves a smaller customer base. Thus, ILECs would force CLECs to overbuild a vast portion of the network. CLECs logically do not have the same funding available that the ILECs enjoy from the subsidization from their monopolistic heritages. For instance, as explained previously, SBC will spend $6,000,000,000 to equip approximately 1400 central offices with its

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16 Verizon Proposed NY P.S.C. Tariff 916, Section 5.19.1.1 and 5.20.2.3; BellSouth RT Collocation Amendment, § 3.4; SBC Broadband Service Product Overview, Diagram 1 (June 15, 2000)(see Attachment C).

17 BellSouth RT Collocation Amendment, § 3.4.

18 SBC Draft Overview of Remote Terminal Collocation at 9.

19 BellSouth RT Collocation Amendment, § 3.4; SBC Draft Overview of Remote Terminal Collocation at 2.

OCD/ATM switches, to lay more than 12,000 miles of fiber sheath, to install or upgrade its DSL equipment in 25,000 remote terminals.[20] SBC has estimated that it will spend an average of $1.7 million per central office and $86,000 at each remote terminal (much of which, of course, will be offset through charges to CLECs).[21] That is just within the SBC 13-state region.

72. For nationwide competitors, such as Rhythms, this figure would triple in order for Rhythms to serve the same percentage of consumers in every ILEC region across the country, even if the arrangements were based on market rates as opposed to ICB determinations. Placing entire DSLAMs in the remote terminals where space exists only minimally reduces this estimate. Except where the concentration of potential DSL subscribers is very high, the expense of interconnecting a stand-alone DSLAM at the remote terminal would likely place unaffiliated competitors at a substantial financial disadvantage to the incumbent or its advanced services affiliate, if the incumbent or advanced services affiliate were able to offer DSL-based services using line cards placed directly into the ILECs' DLC, but CLECs were not able to do so.

73. The ILECs' policy of "first-come, first-served" for RT collocation is inherently problematic for the DSL providers that are not affiliated with an ILEC. Because the affiliates have been and will be ensconced in the RT prior to being "spun off" most remote terminals will be nearing exhaust before the competitive DSL service providers, such as Rhythms, will even have a chance to collocate equipment. Also as with traditional collocation, it is likely that ILECs can prevent CLECs from collocating at certain key remote terminal sites based on unilateral determinations about space exhaustion.

74. Collocating line cards in the remote terminal makes the most efficient use of space, thus any ILEC must demonstrate that not a single additional customer can be served out of the

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[20] *SBC Announces Sweeping Broadband Initiative*, Investor Briefing No. 211 (Oct. 18, 1999) at 4 ("*SBC Project Pronto Announcement*") (Attachment E).

right in order to deny a CLEC space. There obviously is no technical concerns with commingling equipment if CLECs were to collocate line cards, as SBC in the context of its Broadband Service will commingle different carriers services on the exact same card.[22] CLECs should be able to mount equipment in any existing space, regardless of whether this means sharing the relay rack/equipment bay or commingling equipment on the same relay rack. This sort of collocation would allow for the least expensive, most efficient means of installing and withdrawing equipment as the use of the remote terminals continues to develop.

75. Consistent with the explanation provided in ¶¶ 38-39, there are no security concerns that should prohibit carriers from commingling equipment, especially in a remote terminal. Nothing can prevent premeditated sabotage, so minimizing the "opportunity" is about the best one can achieve at a reasonable cost. Usually remote terminals include "intrusion" alarming to indicate that a site has been opened and the person has a brief period of time to call a control center, otherwise a security dispatch is made. A log is maintained to record the times and technicians entering the site.

76. ILECs should be required to only deploy remote terminals on a going-forward basis in such a manner that accommodate collocation by competitive carriers. Vendors can, and will, manufacture the remote terminals, and the NGDLC equipment that goes into them, to whatever specification requested. For example, remote terminals can be manufactured to create more space for competitors at little or no extra cost to the ILEC. Another solution would be to allow ILECs to reserve space and allow CLECs to apply for collocaiton in remote terminals in smaller increments, such as single shelves or line card slots. In order to not shut the network off from competition, not only should the general space reservation policy apply to remote terminals,

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21 *SBC Project Pronto Announcement* at 4.

22 *SBC Pronto/CLEC Collaborative Issues Log*, Item 8.35.

CLECs have little hope of deploying equipment in any remote terminal, unless all RTs are capable of housing CLEC DSL line cards either through the removal of equipment, replacement of equipment with newer, smaller, state-of-the-art equipment, deploying or replacing deployed RTs with larger RTs or expandable RTs.

77. ILECs should also not be allowed to waste the limited amount of space in remote terminals with unnecessary ILEC equipment. For example, Verizon requires a demarcation point at a cross connect panel mounted in the CLEC's equipment bay or relay rack for DS1, DS3, and optical services. Generally in a CEV, hut, or cabinet, space is much more limited and it may be that one rack fills up the entire structure, leaving no room to establish such a demarcation point.

78. Another issue that impacts Rhythms' ability to place a DSLAM into a remote terminal is the interconnection to the ILEC plant. Access to the cable pairs presents a different challenge, since they are hardwired to protectors and equipment terminations. Since the copper cable pairs in a CEV may be hardwired, attempting to connect the DSLAM to existing copper lines would require splice entry or re-termination of cable pairs in cases where additional terminal blocks could not be placed. Since service orders arrive sporadically and randomly, hardwiring an existing cable complement to splitters would not prove workable. Both of these alternatives, while technically feasible, are not efficient or practical given the random nature of service requests.

79. One approach would be to run a cable from the remote DSLAM to the FDI adjacent to the remote terminal. For instance in a line sharing scenario, the cable pairs would be divided at the remote terminal such that half of the pairs terminate on the "voice + data" portion of the splitter, and half terminate on the "voice only" portion of the splitter. At the FDI end of the cable, again the "voice + data" pairs would be terminated on a designated portion of the

terminations while the "voice only" pairs would be connected to other terminations so designated. Whenever a line share arrangement is required, the existing cross connection in the FDI would be removed between the distribution cable pair and the feeder cable pair that fed the end user location.

80. In turn, the distribution cable pair would be cross-connected to the "voice + data" termination and the feeder cable pair would be cross-connected to the "voice only" termination. This configuration rearranges the route of the end user line such that the one that previously went straight through the FDI to the equipment in the remote terminal would now route from the end user distribution cable pair, through the FDI to the remote mounted splitter, back to the FDI and then to the equipment in the remote terminal via the feeder cable pair. Since generally the FDI is located close to the remote terminal, the work involved is relatively minor. Moreover, this would solve the problem of having to address random service requests. The "data" portion of the signal from the splitter in the remote location would be wired to the DSLAM for subsequent transmission back to the central office. In this way, the distribution cable pair could be cross connected to the CLEC cable for routing to the DSLAM and subsequent transport to the central office.

COMPETITION IN THE NGDLC NETWORK ARCHITECTURE

81. CLECs require nondiscriminatory access to the ILECs' remote terminals and unbundled sub-loops in order to deploy advanced services rapidly. The plant configuration assembled for the fiber-fed DLC loop network is simple. Fiber-fed loops, as illustrated in Attachment D,[23] are partially comprised of: (1) the loop feeder that terminates to a remote terminal in the field (within several thousand feet of the customer) is made of fiber optic cable; (2) at the remote terminal, there are NGDLC electronics at the end of the fiber portion of the

loop, which transform the signal on the loop from optical to electrical form; (3) as the loop signal exits the DLC electronics in electrical form, it travels over a copper feeder cable where it is connected to the copper distribution pair in the SAI; and (4) that copper distribution cable travels from the field side of the ILECs' SAI to customer's location. ILECs must required to actively take the needs of competition into account as part of their network modernization process, otherwise their network modifications will either deliberately or inadvertantly create a proprietary network hostile to interconnection. Such a process has the effect of forcing competitors to begin lengthy regulatory procedures to win access to network options one-at-a-time. Meanwhile, consumers are deprived of the benefits of competitive availability of high-speed data services.

82. Today, the ILECs alone can most easily and efficiently reach customers served by fiber-fed loops because they unilaterally controls access to the fiber sub-loop facilities and remote terminals. According to the discussion at the FCC's Public Forum on May 10, 2000, for 56% of consumers in the Bell South region are currently served on DLC, while 25% of consumers in the SBC region and 18% of consumers in Verizon's legacy Bell Atlantic region are served by fiber.[24] If the ILECs are allowed to restrict CLEC access to either the remote terminal or subloops—including both the copper and fiber portions of the loop—they will be able to block competition for a significant block of consumers served by these facilities.

83. ILECs are currently increasing the amount of fiber and NGDLC in their networks in part in order to enhance their ability to deploy advanced services. Currently, most ILECs or their advanced services affiliates only offer the ADSL service as their only retail xDSL service. The ADSL technology is only able to serve up to 16 kilofeet, however most ILECs decide to stop

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[23] Attachment D, Illustration of Fiber-Fed DLC Configuration.

offering the service over 9-12 kilofeet. For this reason, the ILECs have decided to deploy NGDLC networks that deploy fiber into the loop plant, shortening the length of the copper part of the circuit to no more than 12 kilofeet.[25] In particular, almost a year ago BellSouth reported that the percentage of customers within 12 kilofeet of fiber was 95% of its customers in its top 30 markets and 85% of all customers.[26] NGDLC integrates traditional DLC and fiber optic multiplexer functions.

84. ILECs nationwide are actively engaged in upgrading the DLC equipment in their local exchange affiliates' networks throughout their regions to facilitate the provisioning of DSL-based services over fiber-fed loops. Last October, SBC announced Project Pronto, its $6 billion initiative to deploy "fiber, electronics and ATM technology in order to create a robust, comprehensive, data-centric broadband network architecture."[27] BellSouth plans to accelerate growth of its fiber-fed loop plant over the next several years, all of which will be served over NGDLC.[28] Over the past 10 months, Verizon has spent well over $2 million in Pennsylvania alone to install new fiber-optic cable and associated NGDLC electronics in order "to modernize the local telephone network and provide additional broadband capability to its customers."[29]

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[24] FCC's Forum on Competitive Access in Next Generation Remote Terminals, Tr. 10-13 (May 10, 2000)("FCC DLC Forum"); *BellSouth CLEC Issues/Action Items* as of 9/14/00, Item 0518-09.

[25] *BellSouth to Deploy Innovative New Fiber Technology for Delivering Advanced Broadband Services to the Home; In re Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorizations from Ameritech Corporation, Transferor, to SBC Communications, Inc., Transferee,* CC Docket No. 98-141, Reply Comments of SBC Communications Inc. in Support of a Determination that SBC Incumbent LECs May Own Combination Plugs/Cards and Optical Concentration Devices at 3 (Mar. 10, 2000).

[26] *BellSouth to Deploy Innovative New Fiber Technology for Delivering Advanced Broadband Services to the Home.*

[27] *SBC Announces Sweeping Broadband Initiative* at 1.

[28] FCC DLC Forum, Tr. 18.

[29] *Bell Atlantic Deploys Fiber Optics, Electronics, Bringing Additional Advanced Technology, Services to Beaver County,* <http://newscenter.verizon.com/proactive/ newsroom/release.vtml?id=35810> (June 23, 2000); *Bell Atlantic Deploys Fiber Optics, Electronics, Bringing Additional Advanced Technology, Services to Westmoreland County,* <http://newscenter.verizon.com/proactive/ newsroom/release.vtml?id=37409> (Mar. 7, 2000); *Bell Atlantic Deploys Fiber Optics, Electronics, Bringing Additional Advanced Technology, Services to Southern Chester County,* <http://newscenter.verizon.com/proactive/newsroom/release.vtml?id=37399> (Mar. 3,

85. Deployment of DSLAMs by the ILECs at remote terminal locations may preclude any CLECs' ADSL service offerings over any copper loops that bypass the remote terminals, as explained further in ¶ 115. RT-based ADSL services have the potential to signficantly interfere with existing home run copper ADSL that share the same distribution facilities. For example, Rhythms may be serving an end user that is 16 kilofeet away from the central office with ADSL that could be impacted by an RT-based ADSL fed from 12 kilofeet. If a CLEC is relegated to proving service solely over home-run copper, and an ILEC places DSLAMs in the remote terminal that serve that CLEC's end user, the transmission of the ILECs' RT-based ADSL signals in the middle of the CLEC's CO-based signal will prevent the CLEC's signal from being usable at its destination. In essence, the RT-based DSLAM works like any other disturber, such as a repeater. By placing DSLAMs in remote terminals in the outside plant, any ADSL signals generated at the remote terminals will cause interference with the weaker ADSL signals generated in the central office, as explained further in ¶ 115.

86. Thus, there is cause for concern in ILEC plans to deploy DSLAMs at the remote terminals, especially since there are no guidelines governing the deployment of the remote deployment with regard to wireline network spectral integrity in an unbundled environment. These DSLAMs are often merely line cards placed in DLC electronics. More importantly, the major ILECs have all entered agreements with equipment vendors to purchase millions of dollars worth of DLC electronics to be integrated into the ILECs' networks for the provision of DSL services. On April 9, 1999, Verizon announced an $800 million deal with Alcatel for the production of DLC electronics.[30] Regarding BellSouth's exclusive deal with Marconi Communications for NGDLC equipment, Marconi's CEO Mike Parton stated that "[t]here is no

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2000); *Bell Atlantic Deploys Fiber Optics, Electronics, Bringing Additional Advanced Technology, Services to Washington County*, <http://newscenter.verizon.com/proactive/newsroom/ release.vtml?id=35810> (Dec. 10, 1999).

question that with this deployment, by the end of 2000, BellSouth will have the largest installed base in North America of broadband network equipment delivering voice, video and high-speed Internet connectivity deep into its network."[31] SBC also has similar arrangements for the $6 billion it plans to spend with Alcatel, Lucent Technologies, Inc., Advanced Fibre Communications, Inc., Newbridge Networks Corp., Siecor Corp. and Cisco.[32] Most recently, Qwest reported its multi-million dollar deal with Tellium, Inc. for next generation all fiber-optic broadband network.[33]

87. There is no question that ILECs would install and maintain the NGDLC equipment for themselves or their affiliates when placing DSLAM line cards in remote terminals. Verizon and SBC are already performing trials of the NGDLC technology that allows for placement of DSL line cards at the remote terminals.[34] Rhythms would be unable to compete for customers served over DLC if not able to place and maintain the DSLAM line cards in the remote terminals, because the ILECs proposals for allowing CLECs to utilize the fiber-fed DLC network architecture will prohibit Rhythms from offering the services which it intends to offer its customers, as explained in greater detail below in ¶¶ 112-120.

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[30] <http://www.alcatel.com/press/current/1999/04_08.htm>.

[31] Press Release, *BellSouth to Deploy Innovative New Fiber Technology for Delivering Advanced Broadband Services to the Home: Exclusive Agreement with Marconi Communications Enhances Commitment to High-speed, Fiber-Based Network Facilities* (Dec. 15, 1999).

[32] *SBC Starts Building Network Pronto*, <http://www.soundingboardmag.com/articles/011new2.html> (Jan. 2000); *SBC, Cisco Forge Strategic Marketing Alliance*, <http://www.sbc.com/news_center/> (April 19, 2000).

[33] *Qwest Communications and Tellium Form Multimillion Dollar Strategic Relationship for Optical Switching*, <http://www.qwest.com/about/media> (September 20, 2000).

[34] Pennsylvania Public Utility Commission arbitration conference Docket Nos. A-310696 and A-310698, at Tr. 207; News Release: SBC to Start Offering DSL Service From Neighborhood Broadband Gateways Deployed Through Project Pronto (August 22, 2000).

DSLAM ELECTRONICS MAKE DSL OVER FIBER POSSIBLE

88. In order to provide DSL service in a fiber-fed network, CLECs must be able to place equipment with DSLAM capabilities at the remote terminal to access the copper portion of the loop. At the remote terminal, there are DLC electronics at the end of the fiber portion of the loop, which transform the signal on the loop from optical to electrical form. In a forward-looking configuration with DSL-compatible DLCs, the copper distribution/feeder pair will terminate on a line card with integrated DSLAM/splitter functionality that plugs into one of the channel banks in the DLC equipment located in the incumbent's RT.

89. Though some ILECs have been reluctant to allow line sharing or splitting in a fiber environment, it is technically feasible for Rhythms to provide its DSL services over the entire loop (from the central office to the customer) that is also carrying a voice signal. The strongest, conclusive evidence that line sharing is technically feasible in a fiber-fed environment is that ILECs, such as SBC, are already providing line sharing over fiber to their affiliates. SBC is in the process of installing such DLC equipment as part of SBC's Project Pronto, SBC's public announcements concerning Project Pronto indicates that the company plans to upgrade, supplement or replace the majority of its DLC equipment over the next three years. Both SBC and Verizon have approved the same Alcatel DLC equipment that performs this function.

COPPER PORTION OF LOOP

90. Rhythms must have access to the copper cable that travels from the remote terminal to the customer's location, whether that copper is part of the distribution or part of the feeder cable. For the most part, ILECs have not recently contested Rhythms' ability to obtain the copper portion of the loop.

91. As shown on Exhibit A, a copper distribution pair runs from the customer premises to the field side of the incumbent's service area interface ("SAI"), where it is connected to a copper feeder pair on the central office side of the SAI. Where the RT and the SAI are different, which they may be, a portion of the "feeder" is also copper (i.e. that part that runs between the SAI and the RT). It is crucial that this section be included in the defined feeder subloop, as some ILECs are redefining the local loop as solely the copper distribution portion of the loop.

FIBER PORTION OF THE LOOP

92. CLECs need UNE access to the fiber feeder, as an unbundled subloop, to get the DSL signal back to the requesting carrier's collocation arrangement at the central office. The loop feeder that terminates at an NGDLC remote terminal in the field (within several thousand feet of the customer) is made of fiber optic cable. The bitstream carrying ADSL from the end user to the RT over copper can be combined with other traffic in the incumbent's SONET equipment at the RT and carried on the same fiber(s) back to the CO. Fiber feeder facilities run between the SONET equipment at the RT and SONET equipment at the incumbent's serving central office. At the central-office-based SONET equipment, there are a number of possible ways to connect the fiber-based signal to the CLECs' networks. For the ATM-based bitstream carrying ADSL, the requesting carrier can take a handoff at an ATM switch in the serving central office or can take a handoff at an ATM edge switch located outside the serving central office.

93. When the fiber portion of the loop is used for DSL service, it does not become packet switched, instead it remains a transmission facility, in this case the same local loop as used to provide any other type of voice or data service. The technology used for fiber transmission is no different whether the fiber is used for voice or data transmission.

94. To meet the service level agreements that Rhythms provides to its own customers, Rhythms must have incrementally guaranteed bandwidth on the fiber feeder with the ability to upgrade or expand the capacity of its current path to protect its DSL customers against the ILECs oversubscribing the fiber. As a result of using ATM technology, communications traffic is carried on virtual transmission paths, known as Virtual Circuits ("VCs"), Permanent Virtual Circuits ("PVCs"), Permanent Virtual Paths ("PVPs"), Switched Virtual Circuit ("SVCs"). There are well established ATM Quality of Service ("QoS") Classes applicable to PVCs and PVPs, which support different services with different latency (delay) requirements. ATM QoS Classes include Available Bit Rate ("ABR"), Constant Bit Rate ("CBR"), Variable Bit Rate – real time ("VBR-rt"); Variable Bit Rate – not real time ("VBR-nt"); and Unspecified Bit Rate ("UBR").

95. The QoS level depends on the type of service to be offered and the needs of the consumer. For instance, UBR may be fine for plain Internet access, but end users will need CBR to receive voice over DSL. Alcatel has indicated that VBR and CBR are currently available on its DLC equipment and has expressed its intentions to continue to make additional capabilities available.[35] In addition, Nortel "will offer on VCs or PVCs, SPCs, or VPs either UBR, UBRt, VBR, VBNt, and a whole variety of capabilities, as well as straight IP.[36] While all QoS classes should be available, there are other operational parameters that are needed for a CLEC to efficiently offer services via an ILEC RT to ensure that the CLEC is not treated as an internet service provider ("ISP") buying services from the ILEC. There needs to be an industry set of requirements that the RT owner needs to adhere to for the purpose of ensuring competitive services to the public.

[35] FCC DLC Forum, Tr. 49, 8-12.

[36] FCC DLC Forum, Tr. 89, 12-14.

96. The ILEC system should consist of one or more DSL access devices located in a remote terminal connected to one or more ATM switches located in the serving central office. The DSL access devices could be stand alone DSLAMs or DSL capable line cards deployed in new or existing multi-function equipment. Competitors will interconnect via an ATM user-network interface ("UNI") on the CO switch. Each DSL UNE will have two virtual connection cross connects. The first is between the DSL port and the trunk interface of the access equipment. The second is between the ATM switch port serving the access equipment and the port serving the service provider.

97. The RT selected should provide a DSL platform that meets a minimum set of requirements. These are divided into system requirements and technology specific requirements. Examples of minimum system level DSL physical requirements are:

- The system must support an asymmetric and a symmetric service.
- These services must be based on industry standard technologies. At this time, these services would be ADSL as defined by ITU G.992.1 (and optionally G.992.2), and G.shdsl as defined by ITU G.991.2.
- The asymmetric service must be compatible with a loop that is simultaneously used to provide POTS.
- The equipment deployed must have the capability to accept new technologies as the industry evolves.
- Technology specific DSL physical layer requirements and provisioning parameters will be dependent on the nature of the technology. For example:
- Port rate must be configurable, both upstream and downstream, where applicable.
- Latency path must be configurable (if more than one exists).
- Interleave depth must be configurable.

98. The layer two protocol for the DSL UNE should be ATM. The interface at the service provider port should be compliant with ATM forum UNI specifications 3.1/4.0. The

ATM service should support multiple virtual circuits over a single physical DSL circuit. The service provider shoul be allowed to specify the VPI/VCI for endpoints both at the user termination of the DSL and the service provider port on the ATM switch. The service must support all of the industry standard traffic management service classes (supporting both real time and non non-real time applications.) The service provider should manage the traffic so that service level agreements (SLAs) can be met in the areas of latency, throughput, cell delay variation, and cell loss.

99. At the time of a service request from an end user, the service provider should be able to determine that an end user is served by a remote facility. The service provider should also know what services are available in that remote terminal. This information, as well as any subsequent order status request must be provided via an electronic interface in real time. When service is ordered, the service provider needs a commit date when the service is to be installed. Upon completion of the installation, the service provider should be given completion notification as well as any demarcation information required. Any jeopardy states encountered must be reported to the service provider in a timely manner via an electronic interface.

100. Provisioning of the options specified by the service definition for the technology employed should be accomplished via an electronic interface. This interface will serve for initial provisioning as well as any subsequent provisioning changes required. The service provider will also need the ability to monitor the service in order to effectively handle customer support issues. This information must be presented in real time via an electronic interface to allow for effective troubleshooting. Examples of information that must be available to the service provider includes, but is not limited to the following:

- Port status (up/down/failed)

- ATM Traffic (cells in/out/errors) per VC at the DSL port as well as the ATM handoff point.
- Physical layer traffic counts, errors, and errored seconds (both current and historical)
- Actual port rate (for rate adaptive services)
- Actual noise margin or SNR

101. The loop provider needs to meet predetermined Service Level Agreements (SLAs) for availability and mean time to repair. Scheduled maintenance must be pre-announced and occur within a pre-determined maintenance window. The loop provider should provide proactive notification of service affecting faults and unscheduled maintenance to all potentially affected service providers. These faults include equipment and component failures of the ATM switch or DSL equipment or circuit failures on the transport circuits between the remote equipment and the CO. Procedures for cooperative troubleshooting of service issues must be developed. Trouble ticket reporting and status must be available via an electronic interface.

102. Electronic data interfaces are essential for service providers to effectively integrate the DSL UNE into their operations. These electronic interfaces should be standardized throughout the industry, regardless of the loop provider's choice of network equipment. This will enable a service provider to efficiently operate their network across multiple loop provider regions. All communication between the loop provider and the service provider required for the operation, administration, maintenance, and provisioning of service should use these electronic interfaces. The loop provider and all service providers should also commit to a periodic review of the DSL UNE. At this review, the input of all service providers, including any service providers associated with the loop provider, will be sought for the purposes of developing new features and functionality.